

REMARKS

Claims 7-19 are pending in this application, claim 19 having been withdrawn from consideration. By this Amendment, claims 7, 8 and 19 are amended. Support for the amendments to claims 7, 8 and 19 can be found in the specification as originally filed, for example, at least at page 1, lines 19-22; page 2, lines 8-11; page 4, lines 11-15; page 6, lines 21-22; page 8, lines 4-18; page 9, lines 24-26; page 10, lines 8-27; page 17, line 10 - page 18, line 2 and page 32, lines 10-17; in original claims 1, 2 and 6; and in claims 7, 8 and 19 as originally filed. In addition, the specification and abstract are amended to correct minor informalities therein. Support for these amendments can be found in the specification as originally filed, for example, at page 6, lines 21-22; page 8, lines 4-18; page 10, lines 8-27 and page 18, lines 11-22. No new matter is added by these amendments.

I. Pending Claims

The Office Action indicates that claims 14-26 are pending in this application, apparently based on the July 1, 2004, Preliminary Amendment. However, on April 11, 2005, the Patent Office indicated, in a Notice of Non-Compliant Amendment, that the July 1, 2004, Preliminary Amendment was non-compliant and would not be entered because it purported to cancel claims 1-13 and add claims 14-26 when only original claims 1-6 had been pending. Applicants submitted a new Preliminary Amendment, on April 29, 2005, in which original claims 1-6 were canceled and new claims 7-19 were added. On September 15, 2005, the Patent Office issued a Restriction Requirement requiring an election between group (A), claim 19 and group (B), claims 1-18. Applicants elected group (B) and traversed the rejection. Based on this history, Applicants respectfully submit that claims 7-19 are pending, and Applicants treat the rejection of claims 14-25 and the withdrawal of claim 26 in the Office Action as a rejection of pending claims 7-18 and withdrawal of pending claim 19.

II. Double Patenting Rejection

The Office Action rejects claims 14-25 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,913,646 to Sakurada et al. in view of U.S. Patent Application Publication No. 2005/0032331 to Nakano. Applicants respectfully traverse this rejection with respect to pending claims 7-18.

Independent claim 7 sets forth an "SOI wafer comprising: a support substrate that may be an insulator support substrate; and at least a silicon active layer formed on the support substrate; wherein the silicon active layer of the SOI wafer is formed by bonding to the support substrate, either via an insulator layer or directly to the support substrate for insulator support substrates, a bond wafer that consists of silicon single crystal grown by Czochralski method, that is occupied by a neutral region outside oxidation-induced stacking faults generated in a shape of a ring and that has no defect region detected by Cu deposition method." Claims 8-18 depend from and incorporate all of the limitations of claim 7.

Sakurada teaches silicon single crystal wafers, and methods for producing silicon single crystal wafers, that are produced according to the Czochralski method. *See* Sakurada, Abstract. The entire wafer plane of the Sakurada silicon single crystal wafer is occupied by a neutral or N region on the outside of oxidation-induced stacking faults (OSF) generated by thermal oxidation treatments in the shape of a ring, and the silicon single crystal wafer does not have defect regions that are detected by Cu deposition methods. *See* Sakurada, Abstract. However, Sakurada does not disclose, nor does it suggest, using such a silicon single crystal wafer as a bond wafer for forming the SOI layer of an SOI wafer. *See generally*, Sakurada.

As admitted by the Office Action, the Sakurada reference does not teach or suggest an SOI wafer in which at least a silicon active layer is formed on a support substrate, wherein at least the silicon active layer consists of silicon single crystal grown by Czochralski method, as

required by claim 7. However, the Office Action takes the position that claim 1 of Sakurada inherently anticipates claim 14 [claim 7] "because a silicon single crystal wafer is a silicon wafer consisted of a silicon active layer (SOI layer) formed on a support substrate." The Office Action relies on Nakano as supporting this rejection, stating that a wafer, including an SOI wafer, can also be called a silicon single crystal wafer, and that this is known in the semiconductor industry, based on Nakano's disclosures of forming an SOI wafer having a silicon active layer formed on a support substrate. *See* Office Action, page 3.

However, Sakurada teaches only silicon single crystal wafers formed by the Czochralski method; Sakurada does not disclose or even suggest using such wafers as bond wafers or bonding two silicon wafers together to create an SOI wafer. *See generally* Sakurada. That is, Sakurada does not teach or suggest an SOI wafer in which the silicon active layer or SOI layer is itself a silicon single crystal wafer, formed by the Czochralski method, in which the silicon single crystal layer is occupied by an N region outside OSF generated in a shape of a ring and has no defect region detected by Cu deposition method, as required by claim 7.

Further, the Sakurada silicon single crystal wafers are occupied by a neutral or N region on the outside of oxidation-induced stacking faults (OSF) generated by thermal oxidation treatments in the shape of a ring, and the silicon single crystal wafer does not have defect regions that are detected by Cu deposition methods. *See* Sakurada, Abstract; col. 6, line 23 - col. 7, line 8. Sakurada does not teach or suggest that its silicon single crystal wafers could or should have any insulating portions. *See generally* Sakurada. In contrast, the claimed SOI wafers include an insulating portion, as the "silicon active layer of the SOI wafer is formed by bonding to the support substrate, either via an insulator layer or directly to the support substrate for insulator support substrates."

For at least the above reasons, Sakurada does not teach or suggest all of the features of independent claim 7, or its dependent claims 8-18.

Nakano teaches forming SOI wafers in which the bond wafer, and optionally the base wafer, is a wafer that is entirely N-region. *See* Nakano, Abstract; paragraphs [0023], [0041]; Specification, page 6, lines 11-27. However, Nakano does not teach or suggest an SOI wafer in which the silicon active layer is occupied by an N region and has no defect region detected by Cu deposition methods. *See generally* Nakano.

For at least the above reasons, Nakano, like Sakurada, does not teach or suggest all of the features of independent claim 7, or its dependent claims 8-18.

Further, the claimed SOI wafers, in which the SOI or silicon active layer is formed from a silicon single crystal wafer, formed by the Czochralski method, in which the silicon single crystal layer is occupied by an N region outside OSF generated in a shape of a ring and has no defect region detected by Cu deposition method, can achieve significant benefits not contemplated by either Sakurada or Nakano. Specifically, the claimed SOI wafers can avoid fine defects that cause electrical faults and reliability derogation. *See* Specification, page 16, line 10 - page 17, line 9. Such defects can occur because micro pit defects on an SOI layer surface can enlarge during acid cleaning and cause breaking of the SOI layer. *Id.* However, the claimed SOI wafers have excellent electrical properties and do not have destruction of the SOI layer, even under acid cleaning conditions. *See* Specification, page 17, line 10 - page 18, line 2.

For at least the above reasons, Applicants respectfully submit that pending claims 7-18 are patentable over Sakurada in view of Nakano. Reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 7-19 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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